

NON-PUBLIC?: N
ACCESSION #: 8712150351

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Calvert Cliffs, Unit 1 PAGE: 1 of 3

DOCKET NUMBER: 05000317

TITLE: Reactor Trip due to Transformer Short

EVENT DATE: 11/11/87 LER #: 87-015-00 REPORT DATE: 12/11/87

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Pat Furio, Licensing Engineer TELEPHONE #: 301-260-4374

COMPONENT FAILURE DESCRIPTION:

CAUSE: C SYSTEM: HA COMPONENT: RLY MANUFACTURER: M430
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At 1626 on November 11, 1987 Unit 1 tripped from 100% power due to the failure of the east secondary bushing (H-3, C phase) of Transformer U-25000-12. The bushing apparently shorted due to weather related problems. The turbine generator tripped on transformer high-side leads differential. The reactor tripped on loss of turbine load. The plant was brought to a safe shutdown condition. Several unrelated problems were encountered during implementation of the safe shutdown procedures.

1. The Turbine Bypass Valve controller did not operate properly.
2. The plant computer was out of service during the event. However, strip chart recorders were functioning and provided the data necessary to properly analyze the event.
3. No. 11 Atmospheric Dump Valve (ADV) stuck open as it was being manually cycled after the trip.
4. AFAS actuated but did not lock in. However, the motor driven auxiliary feedwater pump (No. 13) did start and was secured following verification of main feedwater flow.

Corrective actions are as follows:

- The ADV is being scheduled for a maintenance overhaul.

- A Facilities Change Request (FCR 84-149) has been generated to install a time delay on the motor driven auxiliary feedwater pump to prevent unnecessary starts.
- An investigation to determine and correct root cause of the vibration of the turbine bypass valves has been planned.

(End of Abstract)

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DESCRIPTION

At 1626 on November 11, 1987 Unit 1 tripped from 100% power due to the failure of the east secondary bushing (H-3, C phase) of Transformer U-25000-12 (EIIS EA-XFMR). The bushing apparently shorted due to weather related problems. The transformer is located outdoors on the north side of the turbine building. A snowstorm was in progress at the time and lightning had been seen in the area. These unusual weather conditions are believed to be the cause of the failure. This transformer is a link between the turbine generator (EIIS HA-TG) and the transmission lines leaving the plant. The turbine generator tripped on transformer high side leads differential (indicating that one of the three phases had shorted). The reactor tripped on loss of turbine load (Reactor Protective System feature). The Engineered Safety Feature Systems (other than AFAS) were not actuated during this event. The plant was brought to a safe shutdown condition. Several unrelated problems were encountered during implementation of the safe shutdown procedures.

1. The Turbine Bypass Valve controller (EIIS HA-TCV) did not operate properly to control the reactor coolant system temperature below 537 degrees F. The operators controlled the reactor coolant system temperature by manual control of the Turbine Bypass Valve Controller and brought it to approximately 532 degrees F as required.
2. The plant computer (EIIS ID-CPU) was out of service during the event. Therefore, there was no Sequence of Events or Alarm printout. The Technical Support computer provided data for about 7 minutes post trip. However, strip chart recorders were functioning and provided the data necessary to properly analyze the event.
3. No. 11 Atmospheric Dump Valve (ADV) (EIIS CC-VTV) stuck open as it was being manually cycled after the trip to verify the position indication of the valve which appeared questionable.
4. Although the steam generator (EIIS CC-SG) level was noted to be well above the Auxiliary Feedwater Actuation setpoint, AFAS actuated but did not lock in, i.e., the auxiliary feedwater turbine driven pumps (EIIS CH-P) were not started due to an installed time delay. However, the motor driven auxiliary feedwater pump (No. 13) (EIIS CH-P) did start and was secured following verification of main feedwater flow.

ANALYSIS

1. The Turbine Bypass Valves are used to control the reactor coolant temperature by controlling the quantity of steam removed from the secondary side of the steam generators. These valves are normally used after a trip to control the average temperature of the water in the reactor coolant system. A malfunction occurred in the valve controller relay which did not allow the valves to move through their normal range of motion. Because the valves could not open as far as designed to dump excess steam to the condensers, they could not automatically lower the reactor coolant system temperature below about 537 degrees F. Operators controlled the temperature using the Turbine Bypass Valve Controller in the manual mode. The relay malfunction appears to be the result of vibration which is a result of flow induced vibrations in the steam line. The relay has been replaced and the valve returned to service. (Moore Products, Model 72G-315)

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2. The plant computer became non-operational at approximately the same time as the event occurred. This is believed to have been caused by a power surge, possibly from a lightning strike. The computer was returned to service shortly after the event occurred. The Technical Support Center computer provided data on the plant parameters for seven minutes post-trip. It failed at this point due to a problem with the disk packs. New disk packs have been installed and should correct this problem.

3. As part of the actions taken after the unit trip, the atmospheric dump valve on the main steam line was cycled open. The valve stuck open and required operator action to isolate the line. The cause of the incident is not clear at this time, but a maintenance overhaul will be performed to determine if this condition is unique to this valve.

The dump valves are used to assist in reactor cooldown by relieving steam from the secondary side of the steam generators directly to the atmosphere. During this event, the safety significance of the open valve is minimal because there were no unacceptable primary to secondary leaks in the steam generators and therefore no unanalyzed (UFSAR Chapter 14.15) amount of radiation was released to the atmosphere.

4. The auxiliary feedwater system is actuated by a low steam generator level signal (-170 inches). Although the data does not indicate that the steam generator level fell this low, the auxiliary feedwater system actuated. In this event, the operator secured the motor driven pump after verifying main feed flow was available. A time delay feature is scheduled to be installed on AFAS during the 1988 refueling outage.

This event occurred at 100% power, which is the worst possible condition for this transient. The loss of load event is analyzed in Chapter 14.5 of the

FSAR at 100% power with both the turbine bypass valves and the atmospheric dump valves closed. Because these valves opened as required, there is minimal safety significance associated with this event. No similar events have been reported.

CORRECTIVE ACTIONS

- The ADV is being scheduled for a maintenance overhaul. During this overhaul the cause of the stuck open valve may be determined and, if necessary, the other ADVs will be examined for possible similar conditions.
- A Facilities Change Request (FCR 84-149) has been generated to install a time delay on the AFAS to prevent unnecessary pump starts. This work is scheduled to be completed in 1988.
- An investigation into the root cause of the turbine bypass valve vibration will be conducted. Corrective actions will be taken as appropriate.

ATTACHMENT # 1 TO ANO # 8712150351 PAGE: 1 of 1

BALTIMORE
GAS AND
ELECTRIC

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JAMES R. LEMONS
MANAGER
NUCLEAR OPERATIONS DEPARTMENT

December 11, 1987

U.S. Nuclear Regulatory Commission Docket No. 50-317
Document Control Desk License No. DPR 53
Washington, DC 20555

Dear Sirs:

The attached LER 87-15 is being sent to you as required by 10 CFR 50.73.

Should you have any questions regarding this report, we would be pleased to discuss them with you.

Very truly yours,

/s/ J. R. Lemons
J.R. Lemons
Manager - Nuclear Operations Department

JRL:PSF:plv

cc: William T. Russell

Director, Office of Management Information and Program Control

Messrs: J.A. Tiernan

W.J. Lippold

*** END OF DOCUMENT ***
